

AMENDMENTS TO THE CLAIMS

- At the time of the Action: Claims 8, 9, 18 and 22-25 were pending.
- At the time of the Action: Claims 10-14, 16, 17, 20, 21, and 26-40 are withdrawn.
- Amended Claims: Claims 8 and 9.
- Canceled Claims: 15.
- After this Response: Claims 8, 9, 18 and 22-25 are pending, and claims 10-14, 16, 17, 20, 21, and 26-40 are withdrawn.

1. (Withdrawn) An apparatus, comprising:
a current collector for a fuel cell stack, wherein the current collector physically supports the fuel cell stack within a fuel cell; and
an electrode element of the fuel cell stack attached as a deposited layer to the current collector, wherein the current collector has openings to allow gases of the fuel cell to flow to and from the electrode element.

2. (Withdrawn) The apparatus as recited in claim 1, further comprising an electrolyte attached as a deposited layer to the electrode element.

3. (Withdrawn) The apparatus as recited in claim 2, further comprising a subsequent electrode element attached as a deposited layer to the electrolyte.

4. (Withdrawn) The apparatus as recited in claim 3, further comprising a subsequent current collector attached as a deposited layer to the subsequent

1 electrode element, wherein the subsequent current collector has openings to allow
2 gases of the fuel cell to flow to and from the subsequent electrode element.

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4 5. (Withdrawn) The apparatus as recited in claim 4, further comprising
5 an electrical interconnect connected to one of the current collectors.

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7 6. (Withdrawn) The apparatus of claim 2, wherein the electrolyte layer
8 is attached to the electrode element as a deposited layer having a thickness
9 between approximately 1 micron and approximately 5 microns.

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11 7. (Withdrawn) The apparatus of claim 2, wherein the electrolyte layer
12 is attached to the electrode element as a deposited layer having a thickness less
13 than approximately 1 micron.

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15 8. (Currently Amended) A method, comprising:
16 obtaining a first current collector layer suitable for physically supporting
17 parts of a fuel cell stack, wherein the fuel cell stack includes at least two electrodes
18 and an electrolyte layer;
19 depositing a first electrode on the first current collector layer;
20 depositing the electrolyte layer of the fuel cell stack on the first electrode
21 layer;
22 depositing a second electrode layer of the fuel cell stack on the electrolyte
23 layer;

1 depositing a second current collector layer of the fuel cell stack on the
2 second electrode layer; and

3 mounting the fuel cell stack within an enclosure defining a chamber of a
4 fuel cell, wherein a connection between an inside surface of the enclosure and the
5 first current collector layer physically supports the fuel cell stack within the
6 chamber, and wherein the first current collector layer is cantilevered within the
7 chamber of the fuel cell to support the fuel cell stack.

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9 9. (Currently Amended) The method as recited in claim 8, wherein the
10 ~~first current collector is made of a first material suited to support the fuel cell stack~~
11 ~~and the second current collector is made of a second material not suited to~~
12 cantilevered within the chamber of the fuel cell to support the fuel cell stack.

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14 10. (Withdrawn) The method as recited in claim 8, further comprising
15 defining an etch pattern on the first current collector configured to expose a
16 surface of the first electrode, wherein the pattern is configured to allow the first
17 current collector layer strength to support the fuel cell stack.

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19 11. (Withdrawn) The method as recited in claim 8, wherein obtaining
20 the first current collector layer comprises a stress relief step to release potential
21 energy of unstable molecular configurations that helps the first current collector
22 layer hold a flat surface during temperature variations.

12. (Withdrawn) The method as recited in claim 8, further comprising cleaning at least one flat surface of the current collector material to reduce contact resistance.

13. (Withdrawn) The method as recited in claim 8, further comprising depositing the first current collector layer on a mandrel surmounted by a release layer.

14. (Withdrawn) The method as recited in claim 8, further comprising removing the mandrel and sintering the first current collector layer and the first electrode.

15. (Cancelled)

16. (Withdrawn) The method as recited in claim 11, wherein the stress relief step comprises heating the current collector layer followed by slow cooling to allow molecules to settle into stable positions.

17. (Withdrawn) The method as recited in claim 8, wherein the first and second current collector layers are made of the same material, similarly etched and both are used to support fuel cell stacks in a fuel cell.

18. (Previously Presented) The method as recited in claim 8, wherein the first and second current collector layers are made of different materials, differently

1 etched and only the first current collector layer is used to support the fuel cell
2 stack in a fuel cell.

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4 19. (Withdrawn) The method as recited in claim 8, wherein the first
5 current collector is etched using a temporary material that is removed during a
6 sintering step which leaves the etched first current collector and the first electrode
7 adhered together.

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9 20. (Withdrawn) The method as recited in claim 8, wherein the
10 depositing is accomplished through any one of painting, spraying, plating,
11 electroplating, electrodepositing, vacuum electrodepositing, dip coating, spin
12 coating, sublimating, and evaporating.

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14 21. (Withdrawn) The method as recited in claim 8, additionally
15 comprising removing some of the first and second current collector layers by any
16 one of chemical etching, dry-etching, mechanical etching, optical etching, laser
17 etching, and electron beam etching.

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19 22. (Previously Presented) The method as recited in claim 8, wherein the
20 first current collector layer has a thickness approximately between ten and twenty
21 times a thickness of one of the electrodes or the electrolyte.

1 23. (Previously Presented) The method as recited in claim 8, wherein the
2 first current collector layer has a thickness of approximately between ten and one
3 thousand microns.

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5 24. (Previously Presented) The method as recited in claim 8, wherein the
6 first and second electrode layers or the electrolyte layer have a thickness of
7 approximately five microns.

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9 25. (Previously Presented) The method as recited in claim 8, wherein the
10 first and second electrode layers or the electrolyte layer has a thickness less than
11 five microns.

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13 26. (Withdrawn) A method, comprising:
14 making a patterned form;
15 depositing a material in the patterned form to make a patterned first current
16 collector layer suitable for physically supporting parts of a fuel cell stack, wherein
17 a fuel cell stack includes at least two electrodes and an electrolyte; and
18 depositing a part of the fuel cell stack on the patterned first current collector
19 layer.

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21 27. (Withdrawn) The method as recited in claim 26, further comprising:
22 depositing a first electrode layer of the fuel cell stack on the patterned first
23 current collector layer;
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1 depositing an electrolyte layer of the fuel cell stack on the first electrode
2 layer;

3 depositing a second electrode layer of the fuel cell stack on the electrolyte
4 layer;

5 depositing a second current collector layer of the fuel cell stack on the
6 second electrode layer; and

7 removing the patterned form to expose a surface of the first electrode layer.

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9 28. (Withdrawn) The method as recited in claim 27, further comprising
10 removing some of the second current collector layer to expose a surface the
11 second electrode layer.

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13 29. (Withdrawn) The method as recited in claim 26, wherein the
14 patterned form is a mandrel having a patterned layer of removable material.

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16 30. (Withdrawn) The method as recited in claim 29, wherein the
17 removable material is photo-resist.

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19 31. (Withdrawn) The method as recited in claim 29, wherein the
20 patterned form is removed before one or more of the electrolyte layer, the second
21 electrode layer, and the second current collector layer are deposited.

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23 32. (Withdrawn) The method as recited in claim 29, further comprising
24 sintering at least two layers of the fuel cell stack.

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2 33. (Withdrawn) A fuel cell, comprising:

3 one or more stack assemblies, each stack assembly having an anode
4 electrode, a cathode electrode, an electrolyte, and at least one supporting current
5 collector, wherein the supporting current collector provides structural integrity to
6 the stack assembly; and

7 one or more fuel cell chambers to contain the one or more stack assemblies,
8 wherein at least one surface of a fuel cell chamber physically supports a stack
9 assembly using the supporting current collector of the stack assembly.

10
11 34. (Withdrawn) The fuel cell as recited in claim 33, wherein each stack
12 assembly is made by depositing a first electrode layer on the supporting current
13 collector, depositing an electrolyte layer on the electrode layer, depositing a
14 second electrode layer on the electrolyte layer, and depositing a second current
15 collector layer on the second electrode layer.

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17 35. (Withdrawn) The fuel cell as recited in claim 34, wherein some of
18 the supporting current collector is removed to expose the first electrode layer and
19 some of the second current collector layer is removed to expose the second
20 electrode layer.

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22 36. (Withdrawn) An electronic device, comprising:
23 a means for electrochemically producing energy;
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1 a means for containing the means for electrochemically producing energy;
2 and
3 a current collector to carry electrons to or from the means for
4 electrochemically producing energy, wherein the current collector physically
5 supports the means for electrochemically producing energy in the means for
6 containing.

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8 37. (Withdrawn) The electronic device as recited in claim 36, wherein at
9 least some parts of the means for producing electricity are deposited on the current
10 collector.

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12 38. (Withdrawn) The electronic device as recited in claim 37, wherein at
13 least some parts of the means for producing electricity are deposited by one of
14 painting, spraying, plating, electroplating, electrodepositing, vacuum
15 electrodepositing, dip coating, spin coating, sublimating, evaporating.

16
17 39. (Withdrawn) A method of using a current collector, comprising:
18 depositing an electrode on the current collector;
19 depositing other elements of a fuel cell on the electrode;
20 physically supporting the electrode and the other elements of a fuel cell in
21 at least one fuel cell chamber using the current collector;
22 producing a flow of electrons using the electrode and the other elements of
23 a fuel cell; and
24 carrying at least part of the flow of electrons using the current collector.
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2 40. (Withdrawn) The method as recited in claim 39, wherein the
3 depositing includes any one of painting, spraying, plating, electroplating,
4 electrodepositing, vacuum electrodepositing, dip coating, spin coating,
5 sublimating, evaporating.
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